

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : OJI PAPER CO LTD

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(72)Inventor : WATANABE KAZUO
ISU YUTAKA

(54) THERMAL RECORDING MATERIAL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a thermal recording material which is excellent in image quality and traveling properties during printing, heat-resistant, and low in production cost.

SOLUTION: In the thermal recording material having a thermal recording layer containing a leuco dye and a coloring agent and a protective layer containing an adhesive as a main component on a support, the protective layer contains a lubricant in an amount of 0.5-10 wt.% of the total solid content of the protective layer, and the static coloring starting temperature of the thermal recording material is at least 80° C. The recording material is subjected to calender treatment so that the surface of the protective layer is brought into contact with the surface of a metal roll heated at a temperature between a temperature by 30° C lower than the static coloring starting temperature and the static coloring starting temperature.

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CLAIMS

[Claim(s)]

[Claim 1] In the thermal recording object which has the heat-sensitive recording layer which contains a leuco color and a coloring agent on a base material, and the protective layer which uses adhesives as a principal component 0.5 - 10% of the weight of lubricant is contained to protective layer total solids in this protective layer. And the thermal recording object characterized by carrying out calender processing so that a protection stratification plane may hit the metal roll side which the ***** initiation temperature of a thermal recording object is 80 degrees C or more, and was heated in the temperature requirement below ***** initiation temperature above temperature lower 30 degrees C than ***** initiation temperature.

[Claim 2] The thermal recording object according to claim 1 which is the layer obtained by carrying out spreading desiccation of the coating liquid containing the adhesives with which a protective layer consists of a resin particle emulsion which has a core/shell structure.

[Claim 3] The thermal recording object according to claim 1 or 2 whose resin of the shell section of the resin particle emulsion which has a core/shell structure is the copolymer which was made to carry out copolymerization of an acrylamide (meta) polymer, or (meta) acrylamide and the partial saturation monomer which can be copolymerized, and was obtained.

[Claim 4] A thermal recording object given in any 1 term of claims 1-3 whose lubricant is at least one sort chosen from zinc stearate, stearyl zinc phosphate, and polyethylene wax.

[Claim 5] A thermal recording object given in any 1 term of claims 1-4 which prepared the interlayer who uses polyvinyl alcohol as a principal component between the heat-sensitive recording layer and the protective layer.

[Claim 6] A metal roll surface is JIS. Thermal recording object given in any 1 term of claims 1-5 whose maximum heights (Ry) are 1.0 micrometers or less in the surface roughness based on B-0601.

[Claim 7] JIS of a thermal recording object Thermal recording object given in any 1 term of claims 1-6 whose surface glossiness based on P-8142 is 90% or more.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the thermal recording object which was especially excellent in image quality, glossiness, and the performance traverse at the time of printing about the thermal recording object using the coloring reaction of a leuco color and a coloring agent.

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PRIOR ART

[Description of the Prior Art] The thermal recording object using the coloring reaction of the leuco color and coloring agent by heat is comparatively cheap, is compact, and since the maintenance is also easy, it is widely used as record media, such as facsimile and various computers. [of a record device]

[0003] With expansion of the application of a thermal recording object, the recording rate has become early, and what was the speed which is 1 inch / sec extent conventionally is becoming more than 4 inches / sec. Since it corresponds to such a printer of high speed, the under coat which makes an oil absorption nature pigment a subject is prepared, and although improvement in sensibility and image quality has been aimed at, the satisfying result is not necessarily obtained. Moreover, the need of a thermal recording object with the high-class feeling which gave high gloss is increasing, and there is a thermal recording object which prepared the protective layer by which ultraviolet rays or electron ray hardenability resin was hardened as the manufacture approach of a thermal recording object on the protective layer prepared on the heat-sensitive recording layer or the heat-sensitive recording layer. However, by these approaches, cost starts a hardening facility (UV irradiation, electron beam irradiation). Moreover, the front face after applying a protective layer coating on a heat-sensitive recording layer is stuck on a metal drum side or the high field of smooth nature like a film, although the method (JP,63-256483,A, JP,10-217609,A) of acquiring image quality and the thermal recording object excellent in gloss using the so-called cast method made to dry and exfoliate is learned, the dirt of a metal drum arises, and image quality tends to deteriorate, and a difficulty is in productivity.

[0004] On the other hand, in the demand quality over a thermal recording object, it has gloss as lunch, such as a convenience store, and a label for daily dishes, and recently, also when it is able to warm with a microwave oven further, there is a demand to the thermal recording object with which the natural complexion section of a label is not covered and which has thermal resistance.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In view of said conventional technique, the purpose of this invention is excellent in image quality and the performance traverse at the time of printing, has high glossiness, moreover has thermal resistance, and is to offer a thermal recording object with a cheap manufacturing cost.

[Translation done.]

English Translation of JP2003-182216A

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MEANS TO SOLVE THE PROBLEM

Calender is related to thermal recording body including what is processed the present invention contains lubricant of 0.5-10 % by weight for protective layer total solids by the end of the protective layer in thermal recording body having the protective layer which is based on the thermal recording layer containing leuco dyes and coloring agent and adhesive on support and and static coloring initiation temperature of thermal recording body meets more than 80 degrees Celsius so that protective layer face hits a metal roll face heated to in 30 degrees Celsius higher than low temperature than static coloring initiation temperature in temperature requirement of less than or equal to static coloring initiation temperature.

The thermal recording body which is the layer which protective layer applies coating fluid including bonding adhesive comprising resin particle emulsion having core / shell structure, and the present invention dries, and was provided is related to.

As for the present invention, resin of shell part of a resin particle having core / shell structure is related to the thermal recording body which is the copolymer which copolymerization can put acrylamide polymer or the unsaturated monomer which is acrylamide and copolymerization possibility (meta) (meta), and was provided.

The present invention is related to the thermal recording body which is at least one kind which slip additive is chosen as among zinc stearate, stearyl tribasic zinc phosphate, polyethylene wax.

The present invention is related to thermal recording body provided with the intermediate layer which is based on polyvinyl alcohol between the feeling fever layer and protective layer.

As for the present invention, a metal roll surface is related to the thermal recording body that the greatest altitude (R_y) is equal to or less than $1.0\mu\text{m}$ in surface roughness based on JISB-0601.

The present invention is related to the thermal recording body that surface gloss degrees based on JISP-8142 are more than 90%.

In addition,

Coloring put a thermal recording body in static color development start temperature to prescribe with the present invention with thermal gradient meter (product made in TOYOSEIKI

company, 1.5kg/cm², five seconds), and optical density measured in Macbeth densitometer of coloring part presents the temperature that it is to 0.15.

[0007]

MODE FOR CARRYING OUT THE INVENTION

The present invention is characterized by static color development start temperature (the temperature that optical density becomes 0.15) of thermal recording body being higher than 80 degrees Celsius, but for when this quality was warmed in an electronic oven, skin part not to put on, it is essential.

Thus,

It is necessary static color development start temperature selects leuco dyes, coloring agent, sensitizing agent comprising the thermal recording layer for the purpose of it being than 80 degrees Celsius, and to put together.

[0008]

A thing of various public intellect can be used as leuco dyes contained by the thermal recording layer and coloring agent.

For example, as an operative example of leuco dyes, it is 3,3- screw (p- dimethylaminophenyl) -6 - dimethylamino phthalide, three - (four - diethylamino -2 - methylphenyl) -3 - (four - dimethylaminophenyl) -6 - dimethylamino phthalide, blue color development characteristics color of three - diethylamino -7 - dibenzylamino - benz [a] full Oran, three - (N- ethyl -N-p- tolyl) amino -7-N- methylanilino full Oran, three - diethylamino -7 - anilino full Oran, tile color characteristics color of three - diethylamino -7 - dibenzylamino full Oran, three - cyclohexyl amino -6 - chlorofull Oran, three - diethylamino -6 - carbonyl -7 - chlorofull Oran, red coloring characteristics color of three 6,8- - diethylamino - dimethyl full Oran, three - (N- ethyl -N- isoamyl) amino -6 - carbonyl -7 - anilino full Oran, three - (N- carbonyl -N- cyclohexyl) amino -6 - carbonyl -7 - anilino full Oran, three - diethylamino -6 - carbonyl -7 - anilino full Oran, three - di(n- butyl) amino -6 - carbonyl -7 - anilino full Oran, three - di(n- pentyl) amino -6 - carbonyl -7 - anilino full Oran, three - di(n- butyl) a Color having the absorption wave head is given in near-infrared region such as Mino -7 - (o- fluorophenyl amino) full Oran, three - (N- ethyl -p- toluidino) -6 - carbonyl -7 - anilino full Oran, three - (N- ethyl -N- tetrahydro furfuryl amino) -6 - carbonyl -7 - anilino full Oran, black coloring characteristics color of three - diethylamino -6 - chloro-7 - anilino full Oran, 3,3- one 4,5,6,7- bis [- (four - methoxyphenyl) -1 - (four - dimethylaminophenyl) ethylene -2 - yl] - tetrachloro phthalide, 3-p- (p- dimethylamino anilino) anilino -6 - carbonyl -7 - chlorofull Oran, 3-p- (p- chloroanilino) anilino -6 - carbonyl -7 - chlorofull Oran, 3,6- bis (dimethylamino) fluorene -9 - spiro -3 '- (six' - dimethylamino) phthalide.

Of course,

Is not limited by these , in addition, more than two kinds can be used together.

[0009]

For an operative example of coloring agent, for example, in intramolecule such as 4,4'-isopropylidene diphenol, 4,4'-cyclohexylidene diphenol, 2,2-screw (four-hydroxyphenyl)-4-methylpentane, four-hydroxy benzyl benzoate, 2,4'-dihydroxy diphenylsulphon, 4,4'-dihydroxy diphenylsulphon, four-hydroxy-4'-isopropoxy diphenylsulphon, bis (three-allyl-4-hydroxyphenyl) sulfone, bis (p-hydroxyphenyl) butyl acetate, 1,1-bis (four-hydroxyphenyl)-1-phenylethane, 1,4-bis [α -carbinyl- α -(four'-hydroxyphenyl) ethyl] benzene, phenolic chemical agent such as 1,3-bis [α -carbinyl- α -(four'-hydroxyphenyl) ethyl] benzene, N-(p-toluenesulfonyl) carbamoyl acid-p-cumyl phenyl ester, N-(o-tolyl)-p-toluene sulfo amide, 4,4'-bis (N-p-トルエンシルホニルアミノカボニルアミノ) diphenyl-methane, thing having -SO₂NH-bond, p-chlorobenzoic acid zinc, four two-[-(p-methoxyphenoxy) ethyl Oki ti] salicylic acid zinc, four three-[-(a p-toe) Zinc salt of aromatic carboxylic acid such as Lil sulfonyl] propyl Oki ti] salicylic acid zinc, five-[p-(2-p-methoxyphenoxy ethoxy) cumyl] salicylic acid is given.

Of course,

Is not limited by these, in addition, more than two kinds can be used together.

[0010]

Leuco dyes and use rate rate with coloring agent are selected depending on leuco dyes and kind of coloring agent to use appropriately, it is not limited to particularly, but, in general terms, preferably coloring agent of 1-5 part by weight dimension is used 1-10 part by weight for one leuco dyes part by weight.

[0011]

Sensitizer can be incorporated into the thermal recording layer to raise a keeping quality conditioner and log sensibility to raise conservation stability of record image.

For example, 2,2'-methylenebis (four-carbinyl-6-tert-butylphenol), 4,4'-チオビス (two-carbinyl-6-tert-butylphenol), 4-4'-butylidene bis (6-tert-butyl-m-cresol), 1,1,3-tris (two-carbinyl-4-hydroxy-5-tert-butylphenyl) butane, 1,1,3-tris (two-carbinyl-4-hydroxy-5-cyclohexyl phenyl) butane, 2,2-bis (four 3,5-hydroxy-dibromo phenyl) propane, hindered phenolic compound such as 2,2-bis (four 3,5-hydroxy-dimethyl phenyl) propane, 1,4-jig rishi Jill Oki ti benzene, 4,4'-jig rishi Jill Oki ti diphenylsulphon, four-benzyloxy-4'-(two-carbinyl glycidy Oki ti) diphenylsulphon are embarrassed, and, for an operative example of a keeping quality conditioner to suffer from, epoxy compounds such as di phtalate glycidy, creosol Novolak pattern epoxide resin, phenol Novolak pattern epoxide resin, bisphenol A type epoxide resin is given.

Of course,

Is not limited by these, in addition, more than two kinds can be used together.

[0012]

For example, for an operative example of sensitizing agent, stearic acid amide,

methylenebis stearic acid amide, tele dibenzyl phthalate, p- benzyloxy benzyl benzoate, two - naphthyl benzyl ether, m- terphenyl, p- benzil biphenyl, p- bird agate phenyl ether, di(p- methoxyphenoxy ethyl) ether, 1,2- di(three - methylphenoxy) ethane, 1,2- di(four - methylphenoxy) ethane, 1,2- di(four - methoxyphenoxy) ethane, 1,2- di(four - chlorophenoxy) ethane, 1,2- diphenoxy ethane, one - (four - methoxyphenoxy) -2 - (three - methylphenoxy) ethane, p- methylthio phenyl benzyl ether, 1,4- di(phenylthio) butane, p- acetotoluidide, p- アセトフェネチジド, N- acetoacetyl -p- toluidine, di(β - biphenyl ethoxy) benzene, p- di(vinyloxy ethoxy) benzene, one - isopropylphenyl -2 - phenylethane, oxalic acid di-p- chlorobenzyl ester, oxalic acid di-p- carbinyl benzyl ester, oxalic acid dibenzyl ester are exemplified.

Of course,

Is not limited by these , in addition, more than two kinds can be used together.

These keeping quality conditioners and used amount of sensitizing agent are not limited in particular, but, in general terms, it is 0.5-4 part by weight dimension for one coloring agent part by weight.

[0013]

The thermal recording layer does water with dispersive medium to the public, after an average particle diameter dispersed by agitation / grinder such as ball mill, an atto cigarette lighter, sand mill with sensitizing agent, a keeping quality conditioner by leuco dyes, coloring agent, requirement slightly together or separately for the purpose of it being in lower than $2\mu\text{m}$, swabbing dries for the purpose of it being to around 2-10g/m², and amount of coating after desiccation is formed on support with the thermal recording layer business coating fluid which adhesive is added, and is prepared.

[0014]

For example, for an operative example of bonding adhesive used by the thermal recording layer, water-dispersibility adhesive such as starch, hydroxyethyl cellulose, methyl cellulose, carboxymethyl-cellulose, gelatine, casein, Arabia gum, polyvinyl alcohol, carboxy degeneration polyvinyl alcohol, acetoacetyl radical degeneration polyvinyl alcohol, silicon polyvinyl alcohol, diisobutylene / maleic anhydride copolymer salt, styrene / maleic anhydride copolymer salt, ethylene acrylic acid copolymer salt, styrene acrylic acid copolymer salt, urea-formaldehyde resin, melamine resin, water-solubility adhesive such as amide resin, polyurethane system latex, styrene butadiene latex is given.

For used amount of bonding adhesive, it is 5-30 % by weight extent for total solids of the thermal recording layer.

[0015]

Furthermore,

The thermal recording layer can contain various additive.

For example, for additive to suffer from, amorphism silica of around 0.01-2.0 μm , calcium carbonate, zinc oxide, aluminium oxide, titanium dioxide, aluminium hydroxide, barium

sulfate, talc, kaolin, clay, baking kaolin, pigment such as urea / formalin resin filler, dioctyl sulfo succinic acid sodium, sodium dodecylbenzenesulfonate, lauryl alcohol sulfuric ester sodium, surface active agent such as aliphatic acid metal salt, antifoamer, thickener, pH moderator, UV absorber, a light stabilizer, fluorescent dye, coloration color are given an average particle diameter of primary particle.

Of course,

Is not limited by these , in addition, more than two kinds can be used together.

[0016]

Protective layer of the present invention contains bonding adhesive as an essential ingredient, but use of water borne adhesive is desirable for bonding adhesive to take.

When more preferred, resin particle emulsion having polyvinyl alcohol and core / shell structure uses resin particle emulsion having core / shell structure particularly, most preferred, for water borne adhesive, surface gloss degree of thermal recording body after calender treatment is used so that the log body which is high gloss of higher than 90% is provided.

[0017]

For example, for an operative example of polyvinyl alcohol, complete (part) saponification polyvinyl alcohol, acetoacetyl property modification polyvinyl alcohol, diacetone degeneration polyvinyl alcohol, carboxy degeneration polyvinyl alcohol, silicon degeneration polyvinyl alcohol are given.

The thing which is more than 80 for around 300-3000, saponification frequency is desirable for the degree of polymerization, and it is 1-10 mol % dimension for degeneration degree of each degeneration polyvinyl alcohol.

[0018]

In addition,

For example, was chosen well-known manner as resin particle emulsion having core / shell structure in accordance with manner mentioned in Japanese Patent Laid-Open No. 5-69665 bulletin by group comprising methacrylamide and acrylamide, it is provided by, at a minimum, emulsion polymerizing hydrophobic property polymerization corpuscule (seed corpuscle) of unsaturated monomer as kernel with a kind.

[0019]

As follows,

Was chosen among methacrylamide and acrylamide group , at a minimum, it says with "acrylamide with a kind" (meta).

In a like manner, was chosen nomenclature as "the acrylic acid" (meta) by group comprising methacrylic acid and acrylic acid , at a minimum, a kind is meant, nomenclature kind that "the acrylonitrile was chosen as" (meta) by group comprising methacrylonitrile and acrylonitrile is meant.

[0020]

Seed is 50-100 part by weight for 100 resin part by weight of the shell part that it is seeded for content of acrylamide (meta), and it is polymerized in resin of polymerized shell part, and preferably it is 70-100 part by weight.

[0021]

When seed polymerizes acrylamide (meta), if required, (meta) acrylamide and inter-polymerization can use possible other unsaturated monomer together.

For example, (meta), for other unsaturated monomer, acrylonitrile, styrene, α -methylstyrene, divinylbenzene are given glycidyl acrylate acrylic acid -2 - aminoethyl acrylic acid -2 - ヒドキシプロピル acrylic acid -2 - ヒドキシエチル acrylic acid -2 - ethylhexyl butyl acrylate ethyl acrylate methyl acrylate (meta) (meta) (meta) (meta) (meta) (meta) (meta) (meta).

[0022]

For seed corpuscle, latex corpuscle of various duke intellect such as latex of acrylate system such as butyl acrylate, styrene - butadiene latex, styrene - acrylate system latex is given ethyl acrylate methyl acrylate (meta) (meta) (meta).

In addition,

Acrylamide may be able to leave inter-polymerization by the end of seed corpuscle (meta). Of course is not limited as seed corpuscle by these, more than two kinds may be used together.

On that occasion,

As for Tg of seed corpuscle, it is preferable to be -10 or more around +50 degrees Celsius.

[0023]

In addition,

An average particle diameter of resin particle emulsion of the present invention does not have restriction in particular, but preferably preferably 50-500nm are 70-300nm.

Manner such as used amount of monomer polymerizing a thing, seed adjusting an average particle diameter of raw materials seed corpuscle is adjusted, and adjusting thickness of shell is selected in above methods appropriately, and it should be performed to produce the resin particle emulsion which such an average particle diameter was included in.

[0024]

The following things are given for slip additive to use for protective layer.

Zinc stearate, calcium stearate, polyethylene wax, カルナバロウ, paraffin wax, waxes such as ester wax, bamboo pipe-stem Lil phosphate, oleyl phosphate, alkylphosphate ester such as stearyl phosphate and the alkali metal salt, monomyristic acid glyceryl, monostearin acid glyceryl, monoolein acid glyceryl, distearic acid glyceryl, fatty acid ester of glycerin such as dioleic acid glyceryl, monobamboo pipe-stem Lil acid jig lycee Lil, dibamboo pipe-stem Lil acid jig lycee Lil, monobamboo pipe-stem Lil acid tetra glyceryl, monobamboo pipe-stem Lil acid ヘキサグリセリル, polyglyceryl fatty acid ester such as monobamboo pipe-stem Lil acid deca glyceryl, a silicone oil, material of various duke

intellect can be used.

There is not pasting with a metal abrasive roll, and zinc stearate, stearyl tribasic zinc phosphate, polyethylene wax are the most desirable particularly in that so that the face which is high filtering is provided.

[0025]

Preferred, as for the quantity of slip additive contained by the end of protective layer, 0.5-10 % by weight is inferior to picture quality, traveling performance at the time of a print in thermal recording body in the case of under 0.5 % by weight for protective layer total solids, when, in addition, ten % by weight is gone over, it is inferior to glossiness.

[0026]

Water borne adhesive and crosslinking agent to respond can be used to apply water resistance in particular to protective layer.

In a specific example, polyamideamine epichlorohydrin resin is the preferable, but materials of various public intellect can be used besides it, inorganic compound such as glyoxal, dialdehyde system chemical agent such as dialdehyde starch, polyamine system chemical agent such as polyethyleneimine, melamine resin, diglycidyl system chemical agent such as glycerin diglycidyl ether, dimethylol urea chemical agent, aziridine chemical agent, polyvalence carboxylic acid hydrazide chemical agent, oxazoline, isocyanate chemical agent and ammonium persulfate, ferric chloride, magnesium chloride, boric acid, zirconium carbonate chloride slightly dried fish can be used.

Of course,

Is not limited by these, in addition, more than two kinds can be used together.

What it is used as for water borne adhesive of the whole protective layer in a limit of 1-30 % by weight so that glossiness tends to fall for used amount of crosslinking agent when too much is desirable.

[0027]

Protective layer can use various water borne adhesive together in the limit that does not lose desired effect of the present invention.

For example, for water borne adhesive to suffer from, oxidation starch, hydroxyethyl cellulose, methyl cellulose, carboxymethyl-cellulose, gelatine, casein, Arabic gum, diisobutylene / maleic anhydride copolymer salt, styrene / maleic anhydride copolymer salt, ethylene acrylic acid copolymer salt, styrene acrylic acid copolymer salt, polyurethane system latex, styrene butadiene latex are given.

Of course,

Is not limited by these, in addition, more than two kinds can be used together.

[0028]

Swabbing dries for the purpose of amount of coating after desiccation becoming 0.5-5.0g/m² in the surface of thermal recording layer, and, as for the protective layer, it is formed the protective layer business coating fluid which additive is mixed, and it is agitated.

and is prepared by requirement.

[0029]

Various additive described in the thermal recording layer can be used as the additive which can be contained by the end of coating fluid for protective layer.

[0030]

As for the calendar, high gloss is provided so that temperature of a metal roll face is high, but when it is higher than static coloring initiation temperature, skin part fog occurs, when calendar is processed at low temperature going over 30 degrees Celsius than static coloring initiation temperature, aimed picture quality, glossiness are not provided.

[0031]

When preferred, it processes calendar at metal roll more than $1.0\mu\text{m}$ in surface roughness based on JISB-0601 that the greatest altitude (R_y) is less than $1.0\mu\text{m}$, a metal roll surface is inferior about picture quality, glossiness a little, it shows a tendency.

[0032]

The interlayer that, for example, basis does adhesive having film formation characteristics between thermal recording layer and protective layer can be provided with glossiness of thermal recording body is improved, and to raise chemical resistance of recording department.

[0033]

For example, for bonding adhesive contained by intermediate layer, polyvinyl alcohol, carboxy property modification polyvinyl alcohol, acetoacetyl degeneration polyvinyl alcohol, silicon degeneration polyvinyl alcohol, polyvinyl alcohols such as diacetone degeneration polyvinyl alcohol, starch, hydroxyethyl cellulose, methyl cellulose, carboxymetyl-cellulose, gelatine, casein, Arabia gum, diisobutylene / maleic anhydride copolymer salt, styrene - maleic anhydride copolymer salt, ethylene - acrylic acid copolymer salt, styrene - acrylic acid copolymer salt, acryl system latex, urethane system latex are given.

Was chosen particularly in that by degeneration polyvinyl alcohol such as carboxy property modification polyvinyl alcohol, acetoacetyl property modification polyvinyl alcohol, silicon degeneration polyvinyl alcohol, diacetone degeneration polyvinyl alcohol, at a minimum, one kind be superior to reactivity with crosslinking agent, particularly preferred.

[0034]

In addition,

Pigment can be incorporated into intermediate layer, the thing which, now, was described of the thermal recording layer is given for pigment to take, but, for pigment ratio, 0-30 % by weight dimension is desirable for interlayer total solids.

In addition,

Two kinds of pigment can use the above together.

[0035]

After, for example, thermal recording layer business coating fluid was applied to one face of support or both sides by suitable application methods such as air knife coating, fin bar bulldozing blade coating, pure bulldozing blade coating, a gravure coating, rod bulldozing blade coating, short circuit dwell coating, curtain coating, die coating, and having dried without being limited to about the thermal recording layer, intermediate layer and formation manner of protective layer particularly, is formed by manner interlayer business coating fluid, protective layer business coating fluid are applied on thermal recording layer sequentially more, and to dry.

In addition,

It is selected appropriately, and it is used as support by houses such as paper (neutral paper, acidic paper), a plastics film, synthetic paper, a bonded mat, metal deposition thing.

[0036]

In addition,

For example, besides calendar disposal of in protective layer present invention, each calender may be processed after under coat, feeling heat sheaf, each layer formation of intermediate layer.

[0037]

Thermal recording body of the present invention can add various duke intellect technology in thermal recording body manufacture field to put a perforation in thermal recording body to provide with under coat based on organic or inorganic pigment between support and the thermal recording layer which provide the thermal recording layer and the other face of support with an adhesive layer or barrier layer as necessary.

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EXAMPLE

[Example] Although an example is given to below and this invention is more concretely explained to it, of course, it is not limited to these. In addition, the section in an example and especially % show weight section and weight %, respectively, unless it refuses.

[0039] Mixed stirring of the constituent which consists of the preparation baking kaolin (trade name: ANSI REXX, EC company make, oil absorption [of 110ml] / 100g) 100 section of the coating liquid for example 1** under coats, the 40% water-solution 1 section of sodium polyacrylate, the styrene-butadiene system latex 14 section of 48% of solid concentration, the 10% water-solution of polyvinyl alcohol (whenever [saponification] 98-mol %, polymerization degree 500) 50 section, and the water 200 section was carried out, and the coating liquid for under coats was obtained.

[0040] ** Spreading desiccation was carried out and the under coat was formed so that the coverage after drying the coating liquid for formation under coats of an under coat to the one side side of the alkaline paper (base material) of 64 g/m² might serve as 9 g/m².

[0041] ** A liquid preparation 3 - The constituent which consists of the JI (n-butyl) amino-6-methyl-7-anilino-fluoran 20 section, the 5% water-solution of methyl cellulose 5 section, and the water 25 section was ground until mean particle diameter was set to 1.0 micrometers by the sand mill.

[0042] ** The constituent which consists of B liquid preparation 1, the 1-screw (4-hydroxyphenyl)-1-phenyl ethane 20 section, the 5% water-solution of methyl cellulose 5 section, and the water 25 section was ground until mean particle diameter was set to 1.0 micrometers by the sand mill.

[0043] ** The constituent which consists of the C fluid preparation oxalic acid G p-methylbenzyl ester 10 section, the oxalic acid G p-chloro benzyl ester 10 section, the 5% water-solution of methyl cellulose 5 section, and the water 25 section was ground until mean particle diameter was set to 1.0 micrometers by the sand mill.

[0044] ** Formation of a heat-sensitive recording layer.

The ***** initiation temperature of the heat-sensitive recording layer obtained by carrying out spreading desiccation so that the coverage after drying the coating liquid for heat-sensitive recording layers which carried out mixed stirring and obtained the A liquid 25 section, the B liquid 75 section, the C fluid 50 section, the 10% water-solution 100 section of polyvinyl alcohol, the styrene-butadiene system latex 20 section of 50% of solid concentration, and the precipitated-calcium-carbonate 20 section on the above-mentioned under coat might be set to 5g/m² was 115 degrees C.

[0045] ** The latex of 37% of formation solid concentration of a protective layer by which the seed polymerization was carried out (trade name: XFE3571 (particle size of 0.3 micrometers or less)) The ***** initiation temperature which carried out spreading and desiccation and which was measured so that the 250 by Mitsui Chemicals, Inc. section, the 40% dispersion-liquid 10 section of zinc stearate, and the protective layer coating liquid obtained by carrying out mixed stirring of the polyamide amine epichlorohydrin resin (trade name: WS547, product made from Japanese PMC) 20 section of 25% of solid concentration and the water 56 section as a cross linking agent might be prepared and the coverage after desiccation might be set to 4g/m² on the

above-mentioned heat-sensitive recording layer was 113 degrees C. Next, in the surface roughness based on JISB-0601, on the conditions whose skin temperature of the metal roll whose maximum height (Ry) is 0.16 micrometers is a part for 100 degrees C, linear pressure 50 kg/cm, and speed 50m/, calender processing was carried out and the thermal recording object whose ***** initiation temperature is 112 degrees C was acquired so that a metal roll might touch a protection stratification plane.

[0046] In the protective layer of example 2 example 1, the thermal recording object was acquired like the example 1 instead of zinc stearate except having used stearyl zinc phosphate.

[0047] In the protective layer of example 3 example 1, the thermal recording object was acquired like the example 1 instead of zinc stearate except having used the 40% dispersion-liquid 7.5 of a polyethylene emulsion section (trade name: NOPUKOTO PEM-17, Sannopuko make).

[0048] The thermal recording object was acquired like the example 1 except installing the 1.0g of the following interlayers between the sensible-heat layer of example 4 example 1, and a protective layer. 13% water solution of aceto acetylation polyvinyl alcohol (trade name: Z-100, Japanese synthetic chemistry company make, average degree of polymerization 450, whenever [saponification] 98%) was used as the interlayer coating.

[0049] In the calender of example 5 example 1, the thermal recording object was acquired like the example 1 except having made temperature into 110 degrees C.

[0050] It changed into the ingredient of the following contents in the sensible-heat layer of example 6 example 1, and the thermal recording object was acquired like the example 1 except having made roll temperature into 85 degrees C.

[0051] The constituent which consists of the D liquid preparation 4-hydroxy-4'-isopropoxy diphenylsulfone 20 section, the 5% water-solution of methyl cellulose 5 section, and the water 25 section was ground until mean particle diameter was set to 1.0 micrometers by the sand mill.

[0052] Formation of a heat-sensitive recording layer.

The ***** initiation temperature of the heat-sensitive recording layer obtained by carrying out spreading desiccation so that the coverage after drying the coating liquid for heat-sensitive recording layers which carried out mixed stirring and obtained the A liquid 25 section, the D liquid 50 section, the 10% water-solution 100 section of polyvinyl alcohol, the styrene-butadiene system latex 20 section of 50% of solid concentration, and the precipitated-calcium-carbonate 50 section on the above-mentioned under coat might be set to 5g/m2 was 90 degrees C.

[0053] In example 7 example 1, the thermal recording object was acquired like the example 1 except having made metal roll temperature into 90 degrees C.

[0054] In preparation of the protective layer coating of example 8 example 1, the thermal recording object was acquired like the example 1 except having used the thing of the following contents.

[0055] The protective layer coating liquid obtained by carrying out mixed stirring of the 10% water-solution 650 section of aceto acetylation polyvinyl alcohol (trade name: Z-100, Japanese synthetic chemistry company make, average degree of polymerization 450, whenever [saponification] 98%), the kaolin (trade name: UW-90, EMC company make) 30 section, the 30% dispersion-liquid 17 section of zinc stearate, and the glyoxal 40% liquid 2.5 section was prepared.

[0056] In example 9 example 8, the thermal recording object was acquired like the example 8 except having made roll temperature into 90 degrees C.

[0057] In example 10 example 1, the thermal recording object was acquired like the example 1 except the surface roughness based on JISB-0601 having used the metal roll whose maximum height (Ry) is 1.5 micrometers.

[0058] In example 11 example 10, the thermal recording object was acquired like the example 10 except having made temperature of a metal roll into 90 degrees C.

[0059] In example 12 example 8, the thermal recording object was acquired like the example 8 except the surface roughness based on JISB-0601 having used the metal roll whose maximum height (Ry) is 1.5 micrometers.

[0060] In example 13 example 12, the thermal recording object was acquired like the example 12 except having made temperature of a metal roll into 90 degrees C.

[0061] In example of comparison 1 example 12, the thermal recording object was acquired like

the example 12 except having made temperature of a metal roll into 40 degrees C.

[0062] In example of comparison 2 example 12, the thermal recording object was acquired like the example 12 except having made temperature of a metal roll into 70 degrees C.

[0063] In example of comparison 3 example 12, the thermal recording object was acquired like the example 12 except having made temperature of a metal roll into 135 degrees C.

[0064] In example of comparison 4 example 1, the thermal recording object was acquired like the example 1 except having made temperature of a metal roll into 40 degrees C.

[0065] In example of comparison 5 example 1, the thermal recording object was acquired like the example 1 except having made temperature of a metal roll into 70 degrees C.

[0066] In example of comparison 6 example 1, the thermal recording object was acquired like the example 1 except having made temperature of a metal roll into 135 degrees C.

[0067] In example of comparison 7 example 12, the thermal recording object was acquired like the example 12 except having made 30% water solution of the zinc stearate of a protective layer coating into the zero section.

[0068] In example of comparison 8 example 12, the thermal recording object was acquired like the example 12 except having made 30% water solution of the zinc stearate of a protective layer coating into the 50 sections.

[0069] In example of comparison 9 example 1, the thermal recording object was acquired like the example 1 except having made 30% water solution of the zinc stearate of a protective layer coating into the zero section.

[0070] In example of comparison 10 example 1, the thermal recording object was acquired like the example 1 except having made 30% water solution of the zinc stearate of a protective layer coating into the 50 sections.

[0071] In example of comparison 11 example 6, the thermal recording object was acquired like the example 6 except having made temperature of a metal roll into 30 degrees C.

[0072] In example of comparison 12 example 6, the thermal recording object was acquired like the example 6 except having made temperature of a metal roll into 50 degrees C.

[0073] In example of comparison 13 example 6, the thermal recording object was acquired like the example 6 except having made temperature of a metal roll into 100 degrees C.

[0074] [Glossiness] According to JISP-8142, the glossiness in 75-degree incident angle was measured.

[0075] [Image quality] Using the sensible-heat evaluator (trade name: TH-PMD, Ohkura Electric Co., Ltd. make), each pressure sensitive adhesive sheet for thermal recording was made to color in impression energy 0.50mJ/a dot, the obtained image of the Records Department was observed with the optical microscope, and visual evaluation of the dot repeatability was carried out.

O : the dot is reproduced.

O : the dot is reproduced mostly.

** : Although a part of dot is missing, there is no practical problem.

x : Most dots are missing.

[0076] [Blank paper section natural complexion concentration] The natural complexion section concentration of the acquired thermal recording object was measured with the Macbeth concentration meter.

[0077] [Performance traverse] Using the sensible-heat evaluator (trade name: TH-PMD, Ohkura Electric Co., Ltd. make), each pressure sensitive adhesive sheet for thermal recording was made to color in impression energy 0.50mJ/a dot, and the sound and printing length when printing estimated.

O : it is especially satisfactory.

x : There is a loud sound at the time of transit, and printing length is also extremely short.

[0078] Oilproof [[oilproof]] Edible oil was dripped to the field printed by the sensible-heat evaluator, and viewing estimated shelf life one day after to it.

O : it is completely changeless.

O : it is hardly changing.

x : The printing section decolorizes.

[0079]

[Table 1]

	光沢度(%)	面質	白色部 地肌温度	走行性	耐油性
実施例 1	96	◎	0.10	○	○
実施例 2	96	◎	0.10	○	○
実施例 3	96	◎	0.10	○	○
実施例 4	97	◎	0.10	○	◎
実施例 5	97	◎	0.14	○	○
実施例 6	91	○	0.11	○	○
実施例 7	94	○	0.09	○	○
実施例 8	76	◎	0.12	○	○
実施例 9	67	○	0.10	○	○
実施例 10	93	○	0.09	○	○
実施例 11	91	△	0.08	○	○
実施例 12	65	○	0.11	○	○
実施例 13	52	△	0.10	○	○
比較例 1	40	×	0.09	○	○
比較例 2	49	×	0.10	○	○
比較例 3	77	◎	0.36	○	○
比較例 4	87	×	0.08	○	○
比較例 5	89	×	0.08	○	○
比較例 6	96	◎	0.65	○	○
比較例 7	66	×	0.11	×	○
比較例 8	63	○	0.11	○	×
比較例 9	96	×	0.10	×	○
比較例 10	95	◎	0.10	○	×
比較例 11	82	×	0.09	○	○
比較例 12	84	×	0.10	○	○
比較例 13	91	○	0.29	○	○

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] The thermal recording object of this invention offers the thermal recording object which was excellent in image quality and glossiness, and was excellent in performance traverse so that clearly from Table 1.

[Translation done.]